AN ASSESSMENT OF COMMUNITY PARTICIPATION IN MUNICIPAL SOLID WASTE MANAGEMENT: A CASE OF KIGOMA MUNICIPAL COUNCIL

JONATHAN JOHN

A DISSERTATION SUBUMMITED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE MASTER DEGREE IN PROJECT MANAGEMENT OF THE OPEN UNIVERSITY OF TANZANIA

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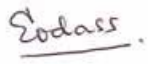
CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation titled "**Assessment of Community Participation in the Municipal Solid Waste Management: Case of Kigoma Municipal Council**" in partial fulfillment of the requirements for the Master Degree in Project Management of the Open University of Tanzania.



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Prof. Odass Bilame

(Supervisor)

……..

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DECLARATION

I, Jonathan John, do hereby declare that this project report is my own original work and that it has not been presented and will not be presented to any other university for a similar or any other degree award.

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Signature

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Date

DEDICATION

I widen my appreciation to my lovely Wife, Elice, children, Godwill, Gladness and Glory for their understanding when they missed my fatherly care when I was busy undergoing my Master of Project Management course. I also enlarge appreciation to my parents, Jonathan Bakunda, and lovable mother, Mary Mkondo and Kigoma/Municipal health secretary, Shomari and Environmental health officer, Mr Bakari, with whom we were undertaking the course together, Mr Jovitus for his sincere support and encouragement apart from his busy learning schedule.

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ABSTRACT

A study was conducted to assess the degree of community participation in solid waste management (SWM). A case of Kigoma municipality, Tanzania, the study involved both quantitative and qualitative approaches in data analysis. The study used both the primary and secondary source data. The primary data were collected through the instrument of questionnaire, interviews, observation, focus groups discussion and secondary data were collected through documentation from Kigoma Municipal Council, internet sources, journal and books. Purposive sampling procedures were used to obtain ten representative wards. At ward level, 10 respondents each from different households were picked at random for the study leading to a sample size of 100 respondents. The collected data were analyzed using Microsoft excel software and SPSS software version 16.0. Results of the study indicated that more than 70% of the solid waste generated is of vegetable and food remains origin. The major limitations at household and community levels are lack of collection and storage facilities which could lead to serious health and environmental problems. Community members perceive SWM as a sole responsibility of local government authorities. Their perception towards SWM is quite low and their attitude in SWM is also unfavorable. It is, recommended that efforts should be directed towards training and awareness creation for purpose of enhancing their participation in SWM. The formation of Environmental committees is crucial in order to increase the participation in SWM at a lower level. For sustainable SWM emphasis should be directed towards composting which should be carried out by specific groups. This could be an attractive alternative in terms of production of fertilizer for the growing subsector of urban agriculture as well as income generation.

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LIST OF ABBREVIATIONS

CBM	Community based management
CBOs	Community Based Organizations
CORE	Center for Organic and Resource Enterprise
EIA	Environmental Impact Assessment
FGD	Focused Group Discussion
GDP	Gross Domestic Product
KMC	Kigoma Municipal Council
LGA	Local Government Authority
MSWM	Municipal solid waste management
NBS	National Bureau of Statistics
NGO	Non Governmental Organization
NSGRP	National Strategy for Growth and Reduction of Poverty
RWA	Resident welfare Association
SPSS	Statistical Package for Social Sciences
SW	Solid Waste
SWM	Solid Waste Management
TSHS	Tanzanian Shillings
UN	United Nations
UNEP	United Nations Environmental Program
URT	United Republic of Tanzania
US	United States
US$	United States Dollar
USEPA	United States Environmental Protection Agency

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

This chapter deals with the background to the problem, statement of the problem, significance of the study, scope of the study, limitations, objectives and research questions. Solid waste management is one of the maximum challenges facing humankind in modern times in spite of the numerous technological achievements that have been well recognized. One of the outcomes of the global urbanization is increasing volume of solid waste. It is estimated that about 1.3 billion metric tons of municipal solid waste was generated globally in 1990 (Buenrostro, 2011). A considerable amount of money goes into managing such huge volumes of solid waste. Asian countries alone spent about US$25 billion on solid waste management per year in the early 1900s. The figure is expected to grow to about US$50 billion by 2025 (Hoornweg and Thomas, 1999). These figures suggest that solid waste management (SWM) has become a large, complex and costly service. In developing countries it is estimated that one to two thirds of the solid waste generated in most urban areas is not collected (Zurbrugg, 2003). As a result, the uncollected waste, which is often mixed with human excreta, is dumped at random in streets and in drains, contributing to spread of diseases.

Solid waste management can be defined as a regulation associated with control of generation, storage, collection, transfer, processing and disposal of municipal solid waste in a way governed by the best principles of public health, economics, engineering, aesthetics and other environmental considerations (Daskalopoulos,

1999). In developing countries, solid waste management is considered to be one of the most serious environmental problems confronting most urban areas (Sinha and Enayetullah, 2000a). In most African countries, management of solid waste is the responsibility of local authorities, which have low capacity in terms of financial, operational, institutional structures, management, and inappropriate technologies, which affect the availability, or sustainability of solid waste management services. Recent events in major urban centres in Africa have shown that the problem of waste management has become serious that has aborted most efforts by city authorities to collect and dispose the generated solid wastes (Onibokun, 1999).

The problem is compounded as these countries continue to urbanize rapidly. The population increase inserts the pressure on local authorities on the management of solid wastes. It is estimated that most municipal authorities can collect and dispose of 20 – 30% of the generated solid waste (Chinamo, 2003). Like in many other countries, waste management is a problem of major concern in most municipalities in Tanzania.

For example, about 200 metric tons of solid waste is generated daily in Morogoro municipality, but the municipal authorities can only collect and dispose less than 35% of the generated waste. Of the uncollected waste, 35% is disposed in refuse pits while 30% is dumped in streets, streams and rivers (SUMO, 2003a). If not properly managed, solid waste creates favourable breeding ground for vermin and insects and causes a serious risk of communicable diseases. In addition, solid waste in waterways causes pollution of the water as well as blocking the flow of water causing flooding during heavy rains.

Hospital wastes are separated and partly incinerated at the hospital, but some other health facilities still mix hospital waste with other solid wastes, other types of solid wastes are usually not separated. Most common solid waste management practices in Tanzania includes incineration, land fill (dumpsites), left uncollected in housing compounds or in open spaces, on streets and in drains contributing to flooding, health and environmental problems (Zerbock, 2003). Solid waste management problem in most cities and towns in Tanzania relates to handling at source, collection, transportation, disposal, financing as well as capacity of the City and other key players.

At the household level there is no mechanism for waste sorting which make it difficult to minimize waste through recycling and safe disposal of waste including the hazardous ones (UN-HABITAT, 2006). Due to the threat posed by solid waste management in urban areas, Tanzania has set National Strategy for Growth and Reduction of Poverty (NSGRP) and health policy.

Among many things addressed in NSGRP in urban areas is the target to improve solid waste management. The challenge, which is facing most urban areas in Tanzania in solid waste management, is the involvement of community and other stakeholders, sensitization of people on solid waste management, financing, and infrastructure for waste management. This research was an attempt to provide a comprehensive review of community participation in solid waste management with the objective of assessing the degree of community participation in solid waste management and come up with suggestions for improvement of SWM.

1.2 Statement of the Problem

Population increase in urban areas of Tanzania has largely resulted from the increase of rural- to-urban movement. Increased population is positively associated with increased generation of different types of wastes. Additionally, a large quantity of solid wastes generated in most urban areas of Tanzania originate from agricultural products. Solid waste management in Tanzania is largely carried out by municipal authorities. This is the mandatory activity which is provided under the Local Government Act, No. 8 of 1982 (Urban Authorities Act).

On the other hand, municipal authorities have very low capacity in solid waste management. It is expected that most municipal authorities can collect and dispose of 20 – 30% of the generated solid waste (Chinamo, 2003). As it is the case in most municipalities and cities in Tanzania, in Kigoma Municipality the cost of managing solid wastes is quite high and significant proportion of the generated waste is left unattended. There is, consequently, a need to involve communities in solid waste management. In any case, large quantity of solid waste is generated by communities. If well organized and planned, communities can successfully and profitably manage solid waste. The most profitable and sustainable way is composting which can be used for urban agriculture and source of income. Earlier studies demonstrated that about 70 - 80 % of the generated urban waste produced in developing countries is agricultural origin which is biodegradable (Akinmoladun and Adejumo, 2011).

This ecological waste can be turned into compost manure for Urban and peri-urban agriculture. This sector is rapidly expanding in Tanzania mainly due to increasing demand for food as well as the means of income supplementation and employment

especially for women and youth (Mlozi, 1995). Composting as a biological approach will not only result in the return of essential soil nutrients but will also help in solving environmental, sanitary and soil conservation problems associated with waste mismanagement. Composting also could minimize the need for costly waste disposal methods such as land filling and incineration.

1.3 Objectives of the Study

1.3.1 General Objective

The purpose of the study is to assess the degree of Community Participation in Municipal Solid Waste Management.

1.3.2 Specific Objectives

(i) To categorize the major sources of solid waste generated.

(ii) To examine the recent solid waste management performance and their limitations.

(iii) To assess the level of awareness and attitude towards community participation in Solid waste management.

1.4 Research Questions

(i) What are the sources and types of solid wastes generated?

(ii) What are the recent solid waste management performances and their limitations?

(iii) What is the level of awareness and attitude towards community participation in Solid waste management?

1.5 Significance of the Study

The study has created awareness and attitude to National Environmental Impact Assessment, Local Government, Municipal Environmental officers on how Community Manage Solid Wastes as well as suggesting solutions to sustain Solid Waste Management performance. The study is of significant as follow:

The study increases the knowledge on Municipal Solid Waste Management implementation problems, to know the effects of Municipal Solid Waste Management, to increase the practical knowledge so as to help the public sectors to keep clean environment and managing domestic solid waste sources. The findings are used as reference to other researchers and to the organization can be used as a source of improvement Municipal Solid Waste Management preparation and implementation. Furthermore, the study acts as a good source of information to the decision makers in Local Government Authorities (LGA) and other Government Sectors.

1.6 Scope of the Study

This research focused on assessment the degree of community participation in solid waste management with reference from Kigoma Municipal Council. The sample comprised Municipal Environmental Officer, households, private community based operators and Community leaders who participated in Solid Waste Management.

1.7 Limitation of the Study

Articles source, journals and some internet sources were not easy to be found because some professionals in internet accessibility were not ready to give assistance on time when the researcher was in need. And some respondents in peri-urban Wards

were not ready to be interviewed during the practice due to inferiority complex and some respondents did not attempt questionnaires accordingly and financial constraints led to delay to process the collected data. To manage this, the researcher had to develop rapport and select few wards and few respondents but with the regard of all requirements for research sample size in order to reduce cost.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter will deal with reviewing different literature reviewed by the researcher in the course of the study. The chapter also presents explanations of major concepts that are of much concern in the topic. It further presents the theoretical framework of the study, the conceptual framework as well as the identification of the knowledge gap in the reviewed literature.

2.2 Definition and Description of Important Concepts and Terms

2.2.1 Community Participation

According to Miles (1994) defines Community participation is the organization of activities by groups of persons who have disabilities (or their family members/ friends), in conjunction with others who do not, to increase their ability to influence social conditions, and in doing so to improve their disability situations. Rifkin, (1985). Point out that community participation range from people passively receiving benefits from health/disability programmes to people actively making decisions about the programme policies and activities.

Through the 1990s, additional emphasis has been placed on community involvement in planning, decision-making and evaluation (Mitchell 1999, Sharma and Deepak, 2001). Therefore, community participation is contribution to the delivery of a health service by contributing money, materials and human resources.

2.2.2 Management

According to Oxford New York, (1999) defines Management as, the people who control a business or Company. Management is the process or skill of dealing with people or situations in successful way thereby, organize, coordinate, distributing and compensation of resources. "Management is the organizational process that includes strategic planning, setting objectives, managing resources, deploying the human and financial assets needed to achieve objectives, and measuring results. Management also includes recording and storing facts and information (Knowledge Management Terms, 2009).

2.2.3 Solid Waste Management

According to Yhdego, (1985) defines SWM as the whole process of generating waste, collecting and transporting waste, and storing waste at transfer stations, street cleaning, disposing waste and waste recovery, recycling and reuse.

2.2.4 Municipal Solid Waste

The US Environmental protection Agency (2008), defines Municipal Solid Waste Management as; the materials traditionally managed by Municipalities, whether by burning, recycling or composting.

2.2.5 Municipal Solid Waste Management (MSWM)

According to Tanzania-Environmental Management Act, 2004, defines Municipal Solid Waste Management as, an essential service that is provided to protect the environment and Public health, promote hygiene, recover materials, avoid waste, reduce Waste quantities, decrease emission, and residuals and prevent spread of

diseases; Also, Chalmin and Gaillochet, (2009) defined municipal solid waste management as the waste generated by residential, commercials and institutional activities occupies about half of that market.

2.3 Theoretical Literature Review

Many studies have been conducted on community participation in solid waste management. Rifkin, (1990). Point out that Community participation were all people, especially the poor and disadvantaged, have both the right and duty to be involved in decisions that affect their daily lives and the services provided are underutilized and misused, because the people for whom they are designed are not involved in their development. (Hoornweg and Thomas 1999) reported that solid waste is an overall term used to include litter and refuse or garbage. Municipal solid waste includes the waste generated from residential areas, commercial, industrial, agricultural, institutional, construction, destruction process and municipal services. In developing countries municipal solid waste include refuse from households, institutions like hospitals and hotels, market places, street sweepings and wastes from industrial and commercial establishments (Tam and Tam, 2008).

Afroz, (2010). Found out that Solid waste management involves control of generation, storage, collection, transportation, processing and disposal in a manner that is in accordance with the best principles of public health, economic, engineering and other environmental concerns Inappropriate waste handling, storage, collection and disposal practices cause environmental and public health risks in urban and peri-urban areas.

Wastes are unwanted or discarded materials that arise from human activities. As applied to this study, domestic solid waste will be unwanted solid material that arises from human activities originating from domestic consumption and production activities. This includes food preparations, sweepings, cleaning, animal manure and disposal of old cloth. Over the years, Tanzania urban and peri-urban areas have suffered a low standard of service regarding collection and disposal of solid waste generated.

Kishimba and Mkenda, (1995), stated that low level of service is a potential risk to community health and environment. The most serious of these are urban pollution and sanitation. Problems in these fields evident themselves in the form of water and air pollution and the unhygienic disposal of solid waste originating from densely populated and mostly unplanned areas with poor environment While disposed with crash sanitary practice percolate shaped by accumulated municipal solid waste can leak into the environment and pollute ground water and surface water. (Hoornweg and Bhanda Tata, 2012)

The health and environmental aspects which are associated with solid waste, give rise to the importance of solid waste management. In studying solid waste management the following elements have to be considered: solid waste composition, generation, storage, collection, and disposal. Transportation of waste from households, factories, and other generation sites is a growing problem. The rapid urbanization of many of the developing countries contributes to the problem of SWM; most rapidly growing parts of cities are at the periphery.

Akinmoladun and Adejumo (2011) reported that large quantity of solid wastes generated in most urban areas of Tanzania originated from residential areas and agricultural products. Solid waste arises from human activities such as consumption and production activities. Agricultural wastes accumulate in market places, households, livestock markets and butcher houses. Agro-waste generated at market places includes remains of fruits, vegetables, fish, livestock products, packaging materials and others resulting from value adding processes. At the household level, agro-waste includes food remains and animal manure in addition to the above.

Iver & Aniana (2001), recognized that community participation in solid waste management covers a variety of types encompasses several forms of local involvement, including: Awareness and teaching proper sanitary behaviour; contributing cash, goods or labour; and or participating in consultation administration, and/or management functions.

With greater public participation, the community can cooperate with public or private entities to set payment rates for service charges. Community management, the highest level of community participation, gives the community authority and control over operation, management and/or maintenance services benefiting its members. Community management may come about through partnership with governmental agencies and NGOs. Community- based waste management CBM projects require institutional support and recognition in order to be successful.

Hazra and Goel, (2009). Have been reported that collection, transfer, and transport practices are affected by improper bin Collection Systems, poor route planning, lack

of information about collection schedule. Lack of knowledge of treatment systems by Authorities is repoted as one factor affecting the treatment of Waste (Chung and Lo, 2008).

Also Waste workers are associated to low social status (Vidanaarachchi et al, 2006). And the situation that gives a result low motivation among the Solid Waste employees. Politicians gives low priority to Solid Waste compared to other Municipal activities (Moghadam et al., 2009). Management of Municipal Solid Waste (MSW) presents a major challenge for numerous of Sub -Sahara African cities and towns where speedy growth, social and cultural changes, extensive spread poverty, scarce and weak local governance and limited financial resources every one contribute to upward pollution and waste disposal problems.

The careless solid waste withholding contaminates surface and ground water provisions. In industrial and urban areas, washing "left" solid wastes can block drains, creating sleeping water for insect reproduction and potential in favor of floods in rainy seasons. Uncontrolled burning and rash burning has a significant pressure on air pollution (Onibokun, 1999).

2.3.1 The Public participation theory

According to Tanzania Environmental Management Act, 2004 defines as theory, which requires the involvement of the people in the development of policies, plans, and processes for the management of the Environment. In Environmental Impact Assessment, stated that, the Council should adopt guidelines on Public Participation,

especially those likely to be affected by the Project being the subject of EI A review or study.

2.3.2 The General Systems Theory

According to abujuant, (1999) defines the general theory as to determine the nature of relationship between various components of a system. The partnership arrangement should be considered dynamic as various factors like population growth, new regulations acquisition of new skills will necessitate change in the arrangement.

The force and direction of change in the work performed by the private and Public sectors should be carefully weighed to maintain optimum balance. Both Public Participation and general system theory helps in visualizing partnership as adapting living beings vying for survival in changing world. This perceptive is valuable in analyzing the needs, evaluations and future direction of partnership.

2.4 Empirical Literature Review

Solid waste is an overall term used to include rubbish and refuse or garbage. According to Hoornweg and Thomas, (1999) reported that Municipal solid waste includes the waste generated from residential areas, commercial, industrial, agricultural, institutional, construction, demolition process and municipal services. Also in line of Tam and Tam, (2008) stated that in developing countries municipal solid waste include refuse from households, institutions like hospitals and hotels, market places, street sweepings and wastes from industrial and commercial establishments.

A large quantity of solid wastes generated in most urban areas of Tanzania originate from residential areas and agricultural products. Solid waste arises from human activities such as consumption and production activities. Agricultural wastes accrue in market places, households, livestock markets and butchery houses.

Agro-waste generated at market places includes remains of fruits, vegetables, fish, livestock products, packaging materials and others resulting from value adding processes. At the household level, agro-waste includes food remains and animal manure in addition to the above. Livestock markets and butchery houses generate manure and other gastrointestinal wastes. Although there is no detailed information, previous studies demonstrated that agricultural wastes accounts for about 70-80% of the urban waste generated in developing countries (Akinmoladun & Adejumo, 2011).

The rest is inorganic waste which includes plastic bags (5%), scrap metals (4%), waste papers (3%), plastic containers (2%), hospital waste (2%), bottles (2%) and other industrial wastes (2%). For example, in Dar es Salaam City markets alone, 1200-1400 tons of solid waste is generated daily out of which 95% is of organic origin (Mbuligwe and Kasenga. 2002). This implies that if proper collection, separation and processing arrangements are in place, the decaying garbage loads that are common in market places could be turned into a valuable resource for agricultural production as well as providing income to hundreds of urban and peri-urban dwellers, especially youth and women.

The composition of waste depends on a wide range of factors such as food habits, cultural traditions life styles, climate and income (Vidanaarachhi et al., 2005). Waste

generation rates per person depend upon the socio-economic conditions of the particular urban society, its cultural background, climatic condition and seasonal variations. Seasonal variation may increase fresh vegetables and fruits availability, thus giving rise to varying rates of waste generation.

Solid waste management involves control of generation, storage, collection, transportation, processing and disposal in a manner that is in accordance with the best principles of public health, economic, engineering and other environmental concerns (Afroz at el., 2010) wrong waste handling, storage, collection and disposal practices cause environmental and public health risks in urban and peri-urban areas. Wastes are unwanted or discarded materials that arise from human activities. As applied to this study, domestic solid waste will be unwanted solid material that arises from human activities originating from domestic consumption and production activities.

This includes food preparations, sweepings, cleaning, animal manure and disposal of old cloth, just to mention a few. in excess of the years, Tanzania urban and peri-urban areas have suffered a low standard of service concerning with collection and disposal of solid waste. This low level of service is a potential risk to community health and environment.

The most serious of these are urban pollution and sanitation. Problems in these fields marked themselves in the form of water and air pollution and the unhygienic disposal of solid waste originating from densely populated and mostly unplanned areas with poor environment (Kishimba and Mkenda, 1995).

The health and environmental features which are associated with solid waste, give rise to the importance of solid waste management. In studying solid waste management the following elements have to be considered: solid waste composition, generation, storage, collection, and disposal.

Transportation of waste from households, factories, and other generation places is a growing problem. The rapid urbanization of many of the developing countries contributes to the problem of SWM. Most rapidly growing parts of Municipalities are at the periphery of accessible settlement. Garbage dumps, with their associated diseases, odour and frequent fires (in some cases) would ideally be located on suitable land away from the most densely populated areas. These areas are becoming harder to find as population urbanize and municipal traffic increases, transportation of wastes becomes more time consuming, and therefore more expensive and less efficient. Many Municipalities employ neighborhood-level collection points, where households are responsible for transportation to the transfer point and the municipal or private enterprise transports the waste from there to the final disposal location (Meidiana, 2010). Transportation also relies on operational vehicles, and frequent breakdowns fixed with parts shortages which can stop collection vehicles for extended periods of time.

UNEP (1996) estimates that in cities in West Africa, up to 70% of collection/transfer vehicles may be out of action at any one time. In areas where there are collection services in which wastes are removed from individual households or streets, often there are no standardized containers used to store waste prior to pickup. Boadi and

Kuitunen (2005), observed that in Barbados, there are no containers designated by municipalities or collection companies to “set out” waste for collection. It is up to individual residences to designate some sort of collection containers. Largely, these are plastic barrels or discarded oil drums. Most of municipalities in developing countries typically lack financial and skills needed to manage solid waste management crisis. Several countries have realized that the way they manage their solid waste does not satisfy the objectives of sustainable development (Qdais, 2006).

However, the majority of households simply place grocery bags full of waste on the street to await collection. Sanitary and efficient waste management must ensure that all and in some cases entire neighborhoods are sited on top of open landfills. For example, the Smoky Mountain dump in Manila, Philippines had as many as 10 000 families living in shacks on or nearby the dump households use some form of corrosion-resistant container with lids in order to facilitate collection.

A major problem is that of development at or on top of landfills; many shanty towns are built from disposed waste and in some cases the entire neighbors are sited on top of existing landfills sites (UNEP, 1996). Away from the obvious health implications, these concentrations of people further complicate transport and unloading procedures and present numerous safety and logistical concerns (Blight and Mbande, 1996).

UNEP estimates that approximately 100 000 people currently scavenge wastes at dump sites in the Latin American region alone. Further, many people, not only those dwelling near landfills, make their living from searching on solid waste before it enters the municipal waste stream. Street-level waste picking often removes

recyclables and other ‘high-value’ waste items from items set out for collection. Although these practices serve to reduce the overall quantity entering the waste stream, they often scatter waste about, compounding problems for pickup and transfer operators (Pfammatter and Schertenleib, 1996).

Knowledge on the source and type of solid waste, along with data on composition and rates of generation, is basic to the design and operation of the functional elements associated with management of solid waste. The decisions on solid waste collection, transportation and disposal cannot be reached at without knowledge of generation, density and composition. According to Mato (2002) reported the composition of solid waste in Dar es Salaam as follows; vegetable waste/organic waste (62.5%), papers (6.2%), glass (0.3%), metal (1.2%), textiles (1.2%), plastic and rubber (1.8%), bones (0.3%) and inert matter (27.3%). Waste management rates per person depend upon the socio-economic condition of the particular urban society, its cultural background, climatic and seasonal variation. Most in developed countries consume greater quantities of goods and hence higher rates of waste generation. Culture, history and climate influence types and consumption habits. Seasonal variations may increase fresh vegetables and fruits availability, thereby giving rise to varying rates of waste generation.

According to Baruti et al. (1992), quantities of domestic solid waste generation in Dar es Salaam city alone are 870 tons per day. This figure is much higher than other sources like market sites, which generate 200 tons per day, industries 100 tons per day, and street cleaning which generate 40 tons per day. According to Mato (2002) only 35 percent of generated wastes were collected and properly disposed off in Dar

es Salaam. Uncollected wastes disposed haphazardly on the streets roadsides and in open spaces.

There is several some human health risks associated with solid waste handling and disposal particularly in developing countries. Cointreau (1982) classified these risks into four main categories: presence of human fecal matter, presence of potentially hazardous industrial waste, the decomposition of solids into constituent chemicals which contaminate air and water systems, and lastly air pollution caused by consistently burning dumps and methane release.

There is perhaps one major approach to solving the problem of municipal solid waste in Tanzania which has not been adequately explored so far, waste recycling. This approach has greatly helped to ease the problems of urban solid waste management in Uganda (Baruti, 1992). Apart from partial recycling of metallic wastes, there is hardly any recycling of solid waste in Tanzania. It is high time recycling could be studied and then institutionalized in the waste management strategy in urban and peri-urban of Tanzania. One of the most potential possibilities is composting of biodegradable component of solid waste.

Maya and Thomas (2007) pointed out that different people according to their cultural context define community participation in communal activities differently. This is emphasized more by Njau and Mruma (2004) who states that community participation means involving people; men and women in the development process as active participants and not as passive recipients at all levels. Peck and Scott (1998) also defined community participation as the process by which individuals and families understand responsibility of their own health and welfare of societies.

Community should be motivated enough to solve their common problems themselves. This enables them to become agents of their own development instead of positive beneficiaries of development aid (Kwawe, 1995). The key to success of solid waste management system in any urban area is the cooperation of citizens. Residents ought to be involved in proper collection, storage, and safe disposal of waste (Moningka 2000).

In the solid waste management context, the term community participation means active and meaningful involvement of the beneficiaries in the management of solid waste. Participation of the community is generally limited to activities associated with primary collection of domestic refuse. Examples of some of the most common roles that communities could undertake are managing waste within the household and removing them from their premises, reducing waste production and facilitating improvement for the purpose of recycling and keeping public areas around the neighborhood clean (Sylvaine, 1999).

According to Howlett and Nagu (2001) said that participation is one of the critical components of success. It has been associated with increasing mobilization of ownership of polices and project; greater efficiency, understanding and social cohesion; more cost-effective services; greater transparency and accountability; increasing empowerment of the poor and disadvantaged; and strengthened capacity of the people to learn and act.

However, the success of community participation in solid waste management depends on other actors involved, such as municipal authorities, Community Based

Organizations (CBOs), micro enterprises, and local leaders. In particular, the municipal authorities play a vital role since in most developing countries the local government is responsible for the delivery of basic services, like waste collection and disposal and for the implementation and enforcement of environmental legislation (Kinyashi, 2006).

Community Based Organizations also can be involved in various activities such as promoting re-use and recycling of materials, hiring waste collectors, collecting fees for waste removal and making arrangements with local authorities (Pfammatter and Schertenleib, 1996). These organizations can be in a form of Local nongovernmental organizations (NGOs), community based organizations (CBOs) or local associations such as Resident Welfare Associations (RWAs), Women's Associations and youth groups. They often use simple equipment and labour intensive methods, and, therefore, can collect waste in places where the conventional trucks of large companies cannot enter; they may be initiated by community members who wish to improve the immediate environment of their homes. Experiences from other parts of the world show that if well planned and executed urban wastes can profitably be re-cycled. In Latin America, for example, cooperatives and NGOs are actively engaged in the collection and separation of wastes in small scale composting enterprises. In Brazil and Argentina CBOs have emerged with a component of refuse collection, separation and composting (Cofie, 2006).

Development which requires participation can no longer be left to chance or to a few groups of individuals. Initiatives from actors working together as stakeholders of development are the rightful means to the development on the right path. Any

effective and meaningful participation in development must involve different players (Mabula, 2007). Moreover, literature suggests that voluntary or other forms of contributions are indeed fundamental to any development activity success (Nyangira, 1970 and Oakley, 1991). The authors assert that voluntary contributions of labour may cover a wide range of practices, from forced labour with a legally enforceable penalty for default, to work in a group voluntarily joined without pressure.

Also, as for the benefit of participatory approaches, Supe (1990) points out that if the people participate in kind they develop a sense of belonging towards the community activity; develop leadership in the village and the confidence of the people increases. Moreover, involvement of beneficiaries ensures that the activities design reflects the peoples' real priorities and the community activities itself reaches, and listens to the voice of the people. Peoples' participation further increases ownership, motivation and ultimately sustainability. The community activities become accountable to the people, generate learning and facilitate encouragement at all levels.

Awareness means contact of an individual to an idea. A study conducted by Supe (1990) specifies that awareness is a description of an individual's an idea but may lack detailed information about it. For example, the community may know the name of an activity but may not know the details. Awareness makes one develop interest that is he/she becomes motivated to find more information about the new idea. Studies by Taneja (2006) suggest that lack of awareness is one of the barriers to community participation. The author noted that any development programme could be effective only when people are aware about it and the benefits that will accrue to them as a result of implementing it.

Reid (2000) also emphasized that the business of participating communities is open to all and widely publicized. Citizens are informed by a variety of means about the community's work and opportunities for citizens to find meaningful roles in contributing to that work. According to Clark and Thomas (1987) cited by Nanai (1993), viewed participation as ethics process in which people achieve a deepening awareness of the reality which shapes their capacity to transform that to reality.

Awareness and attitudes to SWM can affect the population's willingness to cooperate and adequately participate in waste management practices. General environmental awareness and information on health risks due to ineffective solid waste management practices are important factors which need to be continuously communicated to all sectors of the communities. Participation of the community can be by carrying waste to a shared container, by segregating waste to assist recycling activities, or even only by paying for waste management services. Public awareness and community participation would assist in obtaining guidance in carrying out strategic planning of SWM and to enhance appropriate levels of community participation and a two-way communication in planning and implementing of integrated SWM services (World Bank, 2004).

Some examples of continuous education and awareness campaigns are the regular "Green and Clean" campaigns to promote environmental awareness by the Metro Manila Women Balikatan Movement and the Green Forum in Manila (UNEP, 1996). Another example is the Environmental Pioneer Brigade Programme in Sri Lanka where children are made aware of environmental problems and shown how to manage the problems, or how to be preventative that the problems. The education

program builds on the knowledge, values, skills, experiences and determination of human capacity wanted to work on solving waste management issues at an individual and community level (Syagga 1992). Community education plays the role in developing the community's interest and participation in SWM.

Composting is a dynamic biological process in which a mixed microbial population converts heterogeneous organic matter into stable humus like product useful as a soil conditioner and fertilizer (Ngeze and Ruttle, 1983). Golueke (1972) defines composting as the biological decomposition of the organic constituents of wastes under controlled conditions. The finished compost is an environmentally safe, humus-like material that is free of smells and can be beneficially used as a fertilizer and soil conditioner. Unlike most other organic sources, it can be conveniently stored, easily handled and uniformly spread on land with conservative equipment.

Microbial decomposition of unstable organic fractions (found in most agricultural wastes) during composting eliminates smells and produces a stable humus-like organic material which is a source of a wide range of nutrients and provision of long term effect on soil fertility, soil structure, tilth and permeability (Muller and Ruttle, 1994). The heat produced during composting effectively destroys several pathogens, which are harmful to livestock and humans. Composting could minimize the need for costly waste disposal methods such as land filling and incineration.

Composting reduces the quantity of waste going to landfill, biological decomposition of most of the solid waste generated in urban centers is probably the most attractive and sustainable alternative to waste re-cycling. According to CORE (2008),

composting can reduce the amount of materials discarded to landfills by up to 50%. Utilization of composted organic waste materials as fertilizers will not only result in increased production through its potential for contribution of essential nutrients but will also help in minimizing sanitary, environmental and soil conservation problems.

Compost could provide an easily available and affordable source of fertilizer and soil conditioner for low-income earners in urban and peri- urban areas. Processing of solid waste could serve as one of the best fertilizer alternatives if well processed and managed, since inorganic fertilizers are in most cases unaffordable to resource poor farmers (Kimbi and Semoka, 2004). Successful composting requires among other things, suitable materials and construction of appropriate bio-digestion facilities. Previous studies observed that about 70 - 80% of urban solid waste generated is agricultural wastes which are biodegradable (Akinmoladun and Adejumo, 2011). It is also important to develop a system of waste separation and transporting to the composting facility. Experiences from other parts of the world show that if well planned and performed urban wastes can profitably be re-cycled. In Latin America, for example, cooperatives and NGOs are actively engaged in the collection and separation of wastes in small scale composting enterprises. In Brazil and Argentina CBOs have emerged with a component of refuse collection, separation and composting (Fiensten and Morris, 1975).

Urban agriculture is seen as a survival strategy whereas the more wealthy classes see it as a form of recreation (Lober, 2011). It is against this background that many groups are particularly influence authorities to integrate agriculture in urban planning. The objective of such groups is to offer the municipalities an alternative

waste management tool and creation of micro enterprises based on compost making. Such groups seek to create sustainable recycling of solid wastes to produce affordable organic fertilizer (Nzeadible, 2009). The idea is to mobilize communities to collect and make compost out of the generated solid wastes. Composting could be a very viable recovery alternative over solid waste management (Mbuligwe and Kasenga, 2002). Most of local authorities have become economically constrained in providing efficient management of solid waste. Therefore, the possibility of converting municipal solid wastes to organic earth like material by means of composting can provide a significant contribution to the solution (Linzner et al., 2007). As indicated earlier that about 80% of solid waste generated in Tanzania is biodegradable which can be turned into compost if appropriate strategies are in place.

This approach reduces pollution and provides a valuable reserve for chemical fertilizers. Successful composting for urban agriculture and source of income to urban dwellers can sustainably be done under specific groups. In order to form organized and systematic groups several stages must be followed. Some of the reasons that might influence formation of groups include shared interest or common goal and specific needs such as composting for fertilizer and generation of income (Meika, 2011).

Farming in urban and peri-urban areas is a common feature of Sub-Saharan Africa (Mlozi, 1996). Also it is estimated that as many as 40% of the urban population in Africa is involved in urban agriculture (Akinmoladun and Adejumo, 2011). In Tanzania urban agriculture whereby urban dwellers produce food, earn extra income

and use available land and labour resources (Mlozi, 1996). Tanzania's towns, urban agriculture is very common and involves the raising of livestock (dairy cattle, chickens, goats, pigs, etc.) and the cultivation of crops (maize, cassava, legumes, vegetables and fruits).

According to Edwards (2004) urban agriculture is defined as the practice of crop cultivation and livestock rising within the boundaries or the immediate periphery of the city or Municipality. Urban agriculture is increasingly becoming an important sub sector in the Tanzanian economy. Most urban dwellers engage in urban agriculture as a source of food and income supplementation (Sawio, 1993). Mlozi (1996) argued that urban and peri-urban agriculture is rapidly expanding in Tanzania mainly due to increasing demand for food as well as the means of income supplementation and employment especially for women and youth.

Agriculture in Tanzania remains the largest sector in the economy, the sector accounts for about half of GDP and exports. Food crop production has grown at a rate of 3 percent which is about the rate of population growth and accounts for about 65 percent of agricultural GDP, with cash crops accounting for only about 10 percent (Sawio, 1993). Although not well established urban agriculture contributes significantly to GDP.

A considerable proportion of urban agriculture is crop production, such as fruits, vegetables, maize, and beans, bananas that require application of fertilizers, which is the major limitation to increased productivity. Previous studies demonstrated that organic wastes accounts for about 70-80% of the urban waste produced in

developing countries (Akinmoladun and Aadejumo, 2011). With the increasing rate of human population in urban and peri-urban areas it is evident that this sector will continue to grow calling for more complicated management strategies. As the sector continues to grow, it calls also for more sustainable management strategies for the limited resources especially land in line with safeguarding public and environmental health. Agricultural activities in urban areas of Tanzania generate huge amounts of different forms of wastes and significantly contribute to the waste management problem. Re-cycling bio-degradable solid waste is one of the most attractive alternatives in solid waste management.

2.5 Knowledge Gap

Community participation in solid waste management has been extensively researched. There is a large body of both theoretical and empirical research, all points out desirable benefits of Community participation in SW. However, much on of the discussion focused on how to success of community participation in solid waste management depends on other actors involved, such as municipal authorities, Community Based Organizations (CBOs), micro enterprises, and local leaders (Kinyashi, 2006) with little on Collection containers in pre-urban areas for managing of solid waste. According to Meidiana (2010), Many Municipalities employ neighborhood-level collection points, where households are responsible for transportation to the transfer point and its importance on successful knowledge process for managing SW. In the existing body of literature on Community participation and proper collection, storage, separation and safe disposal of waste has been focusing mostly on managing of solid waste (Moningka, 2000).

The Literature reveals that, there is no similar kind of study that has been conducted in and outside Tanzania. One of the studies conducted by Boadi and Kuitunen (2005), points out that there has been limited containers designated by Municipalities to set out waste for collection in Urban. The studies conducted give some indications of the perceptions of Community participation in Solid waste management and how stakeholders influenced by previous knowledge. In this study, he did not address the issue of provision of collection containers used to store waste prior to pickup in Peri-Urban area to study. In the light of the reviewed related literature, the following questions need to be addressed in the context of Solid waste management in Tanzania: Who are responsible in managing solid waste among Stakeholders? What is the importance of Community participation in SWM? To what extent does Community exercise Solid waste management? This study, will therefore, attempt to answer these questions in Tanzanian context by using the case of Kigoma Municipal in Kigoma Region.

2.6 Conceptual Framework (Model) of the study

Kombo and Tromp (2006) defined a conceptual framework as a set of broad ideas and principles taken from relevant fields of inquiry and used to structure a subsequent presentation. Conceptual framework explains either graphically or in a narrative forms the main concepts or variables as well as their presumed relationship with each other (Miles & Huberman, 1994).

Efficient and effective participation of Community in Solid Waste Management depends on various factors such as solid waste management practices, level of awareness & attitudes and Sold waste by-laws about community participation and

participation of key stakeholders such as Local Government, formal private and informal private sectors. These factors if well management will result to efficient, effective and harmonized sanitary Environmental which eventually result into quality life of Public-Community. The relationship between independent, dependent factors and the outcomes can be exemplified as in Figure 1.1.

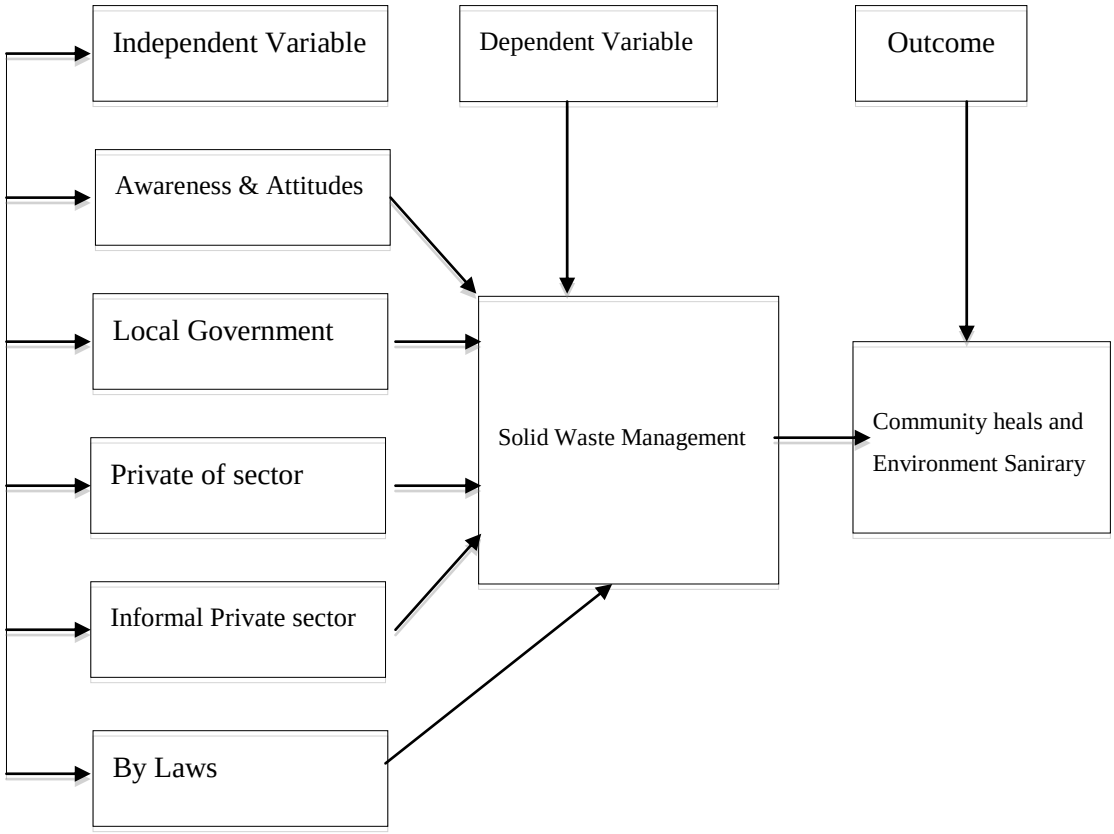

Figure 1.1: Conceptual Framework for Community Participation in Solid Waste Management in Kigoma Municipal Council

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter discusses about the methods used for collecting information from informants in the field of study. It discusses the way this study was conducted, the methods applied and techniques in data collection and gives the reason as to why the data were used according to the research objectives. The chapter states the research approach, design, description of the study area, Sampling techniques and Population, Data Collection, Data collection Methods, Processing and analysis of Data and the validity and reliability and ethics of the study.

3.2 Research Approach

The study employed both qualitative and quantitative Approaches to research. Qualitative approach to research concerned with subjective assessment of attitude, opinions and behavior to form a data a while quantitative approach to research is to form a data which to conclude characteristics or relationship of population (Kothari 2004).

3.3 Research Design

Research design is an arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance with the research purpose (Kombo and Tromp, 2003). However, Bailey, (1998) defines the research design is useful for descriptive purposes as well as for determination of relationship between or among variables.

The study applied the qualitative data that were collected through interview method, observation method, questionnaires and focus groups discussion. And had processed these data collected by using tabulation, classification and analyzed data using statistical analysis, to assess the degree of community participation in solid waste management, case of Kigoma Municipal Council.

3.4 Description of the Study Areas

Kigoma Region is found in west zone of Tanzania, which located along Lake Tanganyika basin. Kigoma Municipal council is among of the growing towns and rapid economic growth in Tanzania, which could influence the negative impact on the environment. Its offices are located before the Regional block Offices. Kigoma Municipal council covers nineteen wards. These are Gungu, Kibirizi, Buhanda, Businde, Machinjioni, Kagera, Kasimbu, Rubuga, Kasingirima, Majengo, Kitongoni, Kipampa, Rusimbi, Buzebazeba, Mwangakusini, Kigoma, Bangwe, Mwanga kaskazini and Katubuka with the total population of the community of 215,458 people with the average of 5.0 households size.

In addition, Kigoma municipal is located along the lake Tanganyika and very closed to Burundi and DRC Congo countries and has initiated the investments due to natural resources available like game reserve park (Gombe*)* and lake Tanganyika catchment area and fishing industry.

3.5 Sampling Techniques

Krishnaswami (2002) defines sampling technique as the process of drawing a sample from a large population. Sampling is used in order to have a representative sample of

the targeted population. In this study sample was drawn from population due to financial and time constraints as well as scattered population in a very wide geographical area which had made sampling necessary. Thus, in this study applied a simple random method.

3.6 Population Size

A sampling design is a definite plan for obtaining a sample from a given population (Kothari, 1997). To get a sample composition of this study, the study selected randomly potential households, students and Local Leaders from Kigoma Wards and the Institute of Adult Education (IAE) as shown in the following Table 3.1.

Table 3.1: **The Sample Size of Respondents**

S/No	Categories of respondents	Male	Female	Total
1.	Households	19	35	54
2.	Environmental Officers	2	1	3
3.	Head of Schools	3	3	6
4.	Ward executive Officers	3	3	6
5.	Institutions	3	4	7
6.	Commercials	3	5	8
7.	Street dwellers	6	4	10
8.	Students	3	3	6
Total		**42**	**58**	**100**

Source: Field survey (2015)

3.7 Data Requirements

Both primary and secondary data occupied a central in the whole process of data collection. Each source of data is discussed hereunder.

3.7.1 Primary Data

Primary data are those data which are collected afresh and for the first time and thus happen to be original in character, Kothari (2004). In this study, primary data were collected throughout the use of observation, interview, Focus group discussions and questionnaire that contained both closed and opened ended questionnaires.

3.7.2 Secondary Data

Secondary data is referred to the data which have already been collected and analyzed by someone else (Kothori 2004). Secondary data may either be published data or unpublished data, in this case the researcher must be very careful in using secondary data and scrutiny because it is just possible that the secondary data may be unsuitable or may be inadequate in context of the problem which the researcher wants to study.

3.8 Data Collection Methods

Data were collected by use of Observation, Interview, focus group discussions (FGD) and Questionnaire which contained structured questions.

3.8.1 Observation Method

Observation Method is the most commonly used method especially in studies relating to behavioral sciences (Kothori, 2004). The information was sought by way of researcher's own direct observation without asking the respondents in order to avoid the subjective bias. This method obtained information about attitudes and behavioral of respondents towards to solid waste management by using observation checklist prepared.

3.8.2 Interview Method

Interview Method of collecting data is the presentation of oral-verbal stimuli and reply in terms of oral-verbal responses Kothari, (2004). This method requires a researcher asking questions generally in a face-to-face contact to the respondent. This Method of collecting data through interview was carried out in structured questions based on specific objective and requires the Interviewer to be on the spot and has to meet people from whom the primary data have to be collected.

3.8.3 Focus Group Discussions (FGD)

Focus group discussions were conducted after carrying out individual interviews. Groups of five members from each ward based on gender and age were used. The purpose was to obtain more clarification and details of the collected data from the respondents. A checklist (Appendix 4) was used to guide the discussions as per specific objectives.

3.8.4 Questionnaire Method

Questionnaire is a written list of questions that are answered by a number of people so that information can be collected from the answers Kothari (2004). In this method a questionnaire was posted to the respondent concerned with the request to answer the questions that were closed and open questions and return the questionnaire. This method of collecting data by posting the questionnaires to the respondents was free from the bias of the researcher.

3.9.1 The Validity of the Data

Validity has been defined by “the extent to which [a test] measures what it claims to measure” (Gregory, 1992). A measure is valid if it measures what it is supposed to

measure Joppe (2000) argues that validity determines whether the research truly measures what it was intended to measure or how truthful the research results are. Therefore, the researcher ensured that the questions designed are based on the specific objectives.

3.9.2 The reliability of the Study

Joppe (2000) defines reliability as: The extent to which results are consistent over time and an accurate representation of the total population and if the results of a study can be reproduced under a similar methodology. This study applied the same with view to achieving reliability as per the objectives of the study.

3.10 Research Ethical Considerations

In carrying out research process, it was important to protect human rights and privacy of respondents from being disobeyed by the researchers. Social research ethics refer to generating a mutually respectful, win-win relationship in which participants are pleased to respond candidly, valid results are obtained, and the community considers the conclusions constructive (Miller & Brewer, 2003).

In this study, before the data collection process, the researcher obtained research clearance letter from the Municipal Executive Director in Kigoma Municipal Council, which permitted him to conduct this study. Permission letter acted as an identity for the researcher to undergo data collection process. In the actual data collection process, voluntary participation of respondents in the provision of required information was considered and practiced by the researcher. Moreover, the

researcher had made sure that the secrecy and confidentiality were maintained. Furthermore, the researcher discouraged the use of names during data collection. Mugenda and Mugenda (1999) argue that respondents should be protected by keeping the information given confidential.

3.11 Processing and Analysis of Data

The data collected were processed, summarized and coded. Analysis was done using the Statistical Package for Social Science (SPSS) and Microsoft excel software. Descriptive statistics (frequencies, and percentages) were used to analyze and summarize the findings. Data were presented in tables, and figures.

3.11.1 Data Processing

Data processing was done using Statistical Package for Social Sciences (SPSS) 16.0 versions and Microsoft excel software.

3.11.2 Data Analysis

Researcher employed both descriptive and inferential methods; collected data, after they were processed computer SPSS package, were tabulated in tables and percentage was calculated so as to facilitate the interpretation as well as drawing a conclusion.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the results and discussion of the study. A series of tables are used. Discussion of the research findings is guided by the following subsections: Household characteristics, Major sources of solid waste generated, common solid waste management practices and their limitations, level of community awareness and community participation, composting as an alternative means of solid waste management and possibility of forming groups for composting and suggestions for improving solid waste management.

4.2 Household Characteristics

The population characteristics examined in this study were; age, sex, marital status, education level, main occupation and income. The purpose of choosing these characteristics was to get the general overview of what the respondents are composed of and how that influence solid waste management practices.

4.2.1 Age and Sex of Respondents

Age is an important demographic variable and is a primary basis of demographic classification in vital statistics, censuses and surveys (URT, 2005c). Table 4.2 presents age groups of respondents participating in community activities ranging from 18 to 60^{+} years. Results in Table 4.2 show that about one third (35 %) of respondents in the study area were aged between 46 – 55 years followed by 25% of the respondents aged 56– 65 years and 20% of the age group of 36-45 years. This

implied that separately from the age group of 18 – 35 years (10%) of the respondents, the other age groups were above the active age group as compared to rest of age groups of 66+ years (10%. The results also reveal that the mean age of respondents was 26 years. The findings shown that adults have more potential labour contribution in agriculture production, environmental conservation and other social communal activities such as solid waste management. They also have more practice and are able to access characteristics of new technologies/ideas (Adesina and Baidu, 2003).

This finding supports the study made by URT (2005c) that the age between 26 – 57 years is within the labour force age group, that is, people in this age group have a tendency to be active, creative and participate in many social and economic activities. In totaling, the findings in Table 4.1 show that 10% of the respondents were between the ages 18–35 years. Similarly, findings indicated that 10 % of the respondents aged 66 years and above account for low percentage which is in line with Nanai (1993) who reported that the level of participation in social and development activities tends to increase with the optimum age group, after which participation starts to decline with increase in age.

Table 4.1: Age Category of Respondents

Age category (Years)	Frequency	Percentage
18– 35	10	10
36 – 45	20	20
46– 55	35	35
56– 65	25	25
>66	10	10
Total	100	100

Source: Field Research (2015)

Table 4.2 shows the sex of respondents in the study area. Out of the 100 respondents interviewed, the highest proportion was females (78%) and 22% were males. An agricultural activity in urban area is largely carried out by women. These results are similar to what was observed by Mlozi (1995) that urban and peri-urban agriculture is largely carried out by women and youth. This is perhaps due to the fact that, large proportion of SW is generated at household level where women are key actors in terms of household activities.

Table 4.2: Distribution of Respondent by Sex

S/No	Sex	Frequency	Percentage
1	Male	22	22
2	Female	78	78
Total		**100**	**100**

Source: Field Research (2015)

4.2.2 Marital Status of the Respondents

Respondents were asked to state their marital status based on the fact that the researcher was interested in knowing the current database of the respondents' of Kigoma Municipality. The findings in Table 4.3 indicated that 67% of respondents were married, 20% divorced 8% single and 5% widowed. The higher proportion of the married couples may suggest that there is high possibility of participation in solid waste management due to complementarities of men and women labour roles within the household, Mandara (1998). Phillip and Abdillahi (2003) observed that married couples show a high level of participation in community development activities probably due to cooperation among them in the marriage institution in the society.

Table 4.3: Marital Status of the Respondents

Marital status	**Frequency**	**Percentage**
Single	8	8
Married	67	67
Divorced	20	20
Widowed	5	5
Total	**100**	**100**

Source: Field Research (2015)

4.2.3 Education Level

Education is always valued as a means of deliverance from ignorance and enables one to perform effectively to any given task within a specified period (Kasanga, 2005). Respondents were asked to state their level of education. Results in Table 4.4 indicated that the majority of the respondents (35.2%) had attained primary education whereas 25.9% of the respondents had no formal education. The rest (22.3%) and 16.6% of the respondents interviewed had attained ordinary level of secondary education and certificate/diploma, respectively.

The results therefore suggest that the majority of community members had basic education and therefore likely to adopt new practices and ideas. Most of the respondents in the study were expected to be more helpful in relation to participation in solid waste management in their communities. The results revealed that high literacy level of the respondents (35.2%) with primary education is lower than the average for Mainland Tanzania, which is reported to be 56% (NBS, 2002), suggesting the chances of effective participation in community activities.

Table 4.4: Distribution of Respondents by Level of Education

Parameter	Frequency	Percentage
Informal education	14	25.9
Primary education	19	35.2
O' level sec. education	12	22.3
Cert/Diploma	9	16.6
Total	**54**	**100**

Source: Field Research (2015)

4.2.4 Main Occupation of the Respondents

The Living standards of Kigoma Municipality people is mainly sustained by income generating projects/small enterprises, Wage/salaried employment, and urban farming and livestock activities. This means that people in Kigoma Municipality employ different income strategies in meeting their daily lives as clearly shown in Table 4.5. According to African Development Bank (2002), income strategy is defined as a range of activities adopted and choices made by smallholders/people in pursuit of household economic and social security.

The results presented in Table 4.5 show that 56% of the respondents were employed in income generating activities. These results are consistent with the Kigoma Municipality profile which estimates that 22% of the residents in the Municipality are appointed in formal sector for their income as wage/Salary. The second highest proportion, which represented by 12% of respondents, included Small enterprise activities as the main occupation and 10% of Labour works. In this category of farming/livestock, it is highly due to the contribution of vegetable growing, cattle rising, maize growing and beans growing.

Table 4.5: Main Occupation of Respondents

Category	Frequency	Percentage
Farming/livestock	56	56
Small enterprises	12	12
Wage/ Salary	22	22
Labour works	10	10
Total	100	100

Source: Field Research (2015)

Also the results indicated that about 56% of Kigoma Municipality people are engaged in urban farming. This means that agricultural activities in urban areas of Tanzania generate large amounts of different forms of wastes and significantly contribute to the waste management problem. If carefully utilized it could be the source of materials for composting which could be ploughed back to urban agriculture as a fertilizer source. According to Akinmoladun and Adejumo (2011) displayed that, about 70 - 80 percent of the generated urban waste produced in developing countries is of agricultural source, which is biodegradable and therefore can be composted.

4.3 Major Sources of Solid Waste Generated

4.3.1 Solid Waste Generation and Composition

The composition of waste depends on a wide range of factors such as food habits, cultural traditions, lifestyles, climate and income (Vidanaarachhi et al., 2005). In the study area, the results revealed that the composition of a large amount of household solid waste is organic or vegetable waste which makes up highest quantity. Results in

Table 4.6 indicated that about 70% of the solid waste comes from the kitchen and 18% come from the garden, large part of it being crop deposits. About 4% comes from other sources such as paper, textiles and rubber remains. The results are dependable with previous studies which indicated that about 70 - 80% of the urban waste produced in Tanzania is organic basis (Akinmoladun and Adejumo, 2011). Sawio (1993) Stated that urban agriculture is increasingly growing as an important sub sector in the Tanzanian economy. Most urban dwellers employ in urban agriculture as a source of food and income supplementation. Also, Mato (2002), conducted research in Dar es Salaam and observed that large portion of domestic solid wastes (62.5%) in the city come from the kitchen and most of it is of organic nature.

Table 4.6: Household Solid Waste Generated Categories in Kigoma Municipality

Solid waste type	**Source**	**Frequency**	**Percentage**
Vegetable and food remains	Kitchen	70	70
Leaves, grass	Garden	18	18
Plastics, bottles, Cans	Market	8	8
Others	Various	4	4
Total		**100**	**100**

Source: Field Research (2015)

According to KMC (2012/13), it is indicated that only 54% of the generated solid waste is collected and disposed off in a mixed form, whereas the rest (46%) is left unattended resulting to health and environmental problems. The concentrated SW is higher compared to what was described by Chinamo (2003) in Sri –Lanka, which

indicated that most municipal authorities can collect and dispose of 20 – 30% of the generated solid waste. The rest is not properly managed causing environmental and health problems.

These findings are consistent with those of Kironde and Yhdego (1995) which specified that most of the solid waste generated in urban and peri-urban areas is left unattended. Results in Table 4.7 indicated that reasons for insufficient collection and disposal of solid waste among others include inadequate collection trucks, inadequate budget, and shortage of staff, poor urban planning infrastructure and lack by-laws enforcement.

Table 4.7: Major Reasons for Inefficient Collection and Disposal of SWM

Major reasons for inefficient collection and disposal of SWM	**Respondents**	
	Yes	**No**
Inadequate trucks for SW collection	6	1
Shortage of staff	5	0
Poor infrastructure	3	0
Inadequate budget	4	1
Poor Urban Planning	5	0

Source: Focus groups discussion (2015)

Results suggest that the major reason for inefficient solid waste management by Municipal council is inadequate collection points and refuse trucks. This is probably due to the increasing urban population resulting into increased generation of solid waste. This is consistent with the study findings by Onibokun (1999) observed that, due to rapid urbanization; the population increase inserts the pressure to local

authorities on the management of solid wastes. And Malisa (2007) observed refuse trucks do not easily access most parts of urban areas, because they are unplanned and these parts carry about 60-70 % of the urban population in Tanzania. This means that, the remaining solid waste has to be managed by other means like disposal pits, incineration and disposal in open spaces.

4.4 Recent Solid Waste Management Performs and their Limitations

4.4.1 Recent Solid Waste Collection, Storage, Transportation and Disposal Practices

Results from focused group discussion indicated that the majority of inhabitants in the study area recognize that the overall procedure of solid waste management is a serious problem in Kigoma Municipality. This is predictable of badly maintained infrastructure that together makes the problem more complex. Most of the municipal authorities have very low capacities of waste collection and disposal. Recent studies in major urban centre in Africa have shown that the problem of waste management has become serious that has terminated most efforts by city authorities to collect and dispose the generated solid wastes (Onibokun, 1999). The problem is composited as these countries continue to urbanize rapidly. The population increase, inserts the pressure on local authorities on the management of solid wastes.

The storage of solid waste at household level, most cities and towns in Tanzania are facing problems of similar nature. The equipments used for solid waste storage are of poor quality. In most cases plastic bags, sacks and plastic buckets are used. These containers are not properly covered as a result they do something as a good reproduction sites for micro organisms and insects. Also they generate bad smell.

The results, also, demonstrate that about 8% of solid waste generated is largely plastics and bottles. This is largely caused by changing lifestyles whereby most of the urban residents use packed products such as water, juice, butter, cooking oils and tomato paste, compared to rural areas. Mato (2002) stated that solid waste composition in Dar es Salaam city was as follows; vegetable waste/organic waste (62.5%), papers (6.2%), glass (0.3%), metal (1.2%), textiles (1.2%), plastic and rubber (1.8%), bones (0.3%) and inert matter (27.3%). He concluded that the current trade liberalization policy and increase in consumerization are a little changing the waste composition in urban areas with a result of important levels of plastics and cans.

Waste generation rates per person depend upon the socio-economic condition of the particular urban society, its cultural background, climatic conditions and seasonal variations. Seasonal variation may increase fresh vegetables and fruits availability, so giving rise to varying rates of waste generation. According to Gidde (2008), it is expected that every person generates 0.5 kg of solid waste daily.

4.4.2 Waste Separation and Recycling

There are several ways to reduce, re-use, and recycle organic materials. Surplus food can be donated to feed hungry people. Yard trappings, food waste, and waste can be made into much compost and used to prevent soil erosion and supply valuable nutrients to plants.

Manufacturing paper using recycled materials conserves resources for the future. By investigating current landscaping, food preparation and disposal practices,

communities, businessmen and individuals can find creative ways to reduce and better manage municipal solid waste (USEPA, 2011). The study results in Table 4.9 indicated that about 93.9% of the respondents do not separate their waste for the reason they recognize that all type of wastes to have similar characteristics. This is dependable with UN-HABITAT (2006) comments that, at the household level there is no mechanism for waste sorting which make it difficult to reduce waste through recycling and safe disposal of waste as well as the hazardous.

Table 4.8: Separation of Solid Waste before Disposal

Separation of solid waste	**Frequency**	**Percentage**
Separate	6	6.1
Not separate	92	93.9
Total	**98**	**100.0**

Source: Field Research (2015)

Results also suggest that lack of separation techniques and facilities could also compound SWM problem. UN-HABITAT (2006) observed that at the household level there is no mechanism for waste sorting which make it difficult to minimize waste through recycling and safe disposal of waste including the hazardous ones.

About 6% of the respondents separate their solid waste into organic and inorganic components before disposing and use them for various purposes. Results in Table 4.9 indicated that the majority (91%) of the respondents do not reuse/recycle solid waste generated. However, 0% of the respondents do not use it as source of energy for instance cooking and heating, whereas 1% re – use them directly, for example use of

plastic bottles and other containers for storing drinking water, cooking oil and kerosene. A negligible proportion of the respondents (8%) use it as soil conditioner/compost manure which they apply in their gardens.

Table 4.9: Recycling and Re-use of Separated Waste

Use of separated waste	Frequency	Percentage
Do not recycle	91	91
Composting	8	8
Source of energy	0	0
Direct re-use	1	1
Total	**100**	**100**

Source: Field Research (2015)

4.4.3 Major Solid Waste Management Limitations

The significant role played by community in solid waste management at household level has been discussed earlier. The major limitations associated with solid waste management at household and the community levels were explained to focus group discussion results (Table 4.10) indicated that, the major limitations associated with SWM were; lack of collection and storage bins, lack of separation techniques, lack of by-laws enforcement, lack of transport facilities and lack of collection centers. Blight and Mbande (1996) observed that most cities in developing countries are facing problems of waste management which is largely caused by low capacity of municipal authorities. Collection, storage facilities are in most cases not adequate leading to the possibility of environmental and health problems.

Table 4.10: Major Limitations for Solid Waste Management at Household and Community Levels

Major limitations associated with SW	Respondents	
	Yes	No
Lack of collection and storage bins	6	1
Lack of separation techniques	4	2
Lack of by-laws enforcement	3	1
Lack of transport facilities	5	1
Lack of collection centers	5	2

Source: Focus group discussions (2015)

4.5 Level of Awareness and Attitude of the Community towards Solid Waste Management

4.5.1 Community Awareness and Perception about Solid Waste Management

Awareness is a key factor for effective participation and successful implementation of community activities. According to Taneja (2006) suggest that lack of awareness is one of the barriers to effective community participation. The results in Table 4.11 demonstrated that about 48% of the respondents have low perception towards solid waste management. They are belief that SWM only implies collection and disposal of the wastes by municipal authorities. The results are reliable to the observations from the focus group discussions which indicated that most members of the community see SWM to be the responsibility of Local government.

A significant proportion of respondents (39.8%) see SWM simply as disposal in open and undesignated places such as water streams, market places and roadsides. This is consistent with earlier observations that local government authorities are only

capable of collecting and disposing 20 -30% of the generated solid waste. The rest is not properly managed leading to serious health and environmental problems (Chinamo, 2003). The rest (4.1%) and 6.1% perceive SWM as incineration and dumping in designated landfills all of which are unsustainable practices. They all involve around shifting a problem from one place to another. Most of the solid waste in urban areas is generated by members of the households. It is, therefore, their primary obligation to ensure that they participate in SWM. Unfortunately most of the community members do not adequately participate in SWM due to reasons such as perception that it is largely a responsibility of local authorities and lack of appropriate by-laws enforcement and even enforcement of the existing by-laws.

Table 4.11: Perception of SWM as Perceived by Respondents

Perception of SWM by respondents	Frequency	Percentage
Collection of solid waste by local authorities	47	48
Largely by incineration	4	4.1
Dumping wastes in designated landfills	6	6.1
Disposal of trash in open places	39	39.8
Proper collection recycling and disposal of solid waste	2	2
Total	**98**	**100**

Source: Focus group discussion (2015)

Irrespective of the low awareness and misconception about responsibility with regard to SWM, respondents were asked how they became aware of SWM. The results in Table 4.12 indicated that the majority (70.4%) of the respondents became aware through campaigns by Ward development Committee and few (20.4%) and (9.2%)

familiarized themselves through fellow community members and their own initiatives. This implies that there are little efforts to emphases the community members about the importance of solid waste management in most of urban and peri-urban areas. It would appear that environmental issues such as SWM are largely left to Ward development committees. Taneja (2006) observed that understanding of communities on development matters calls for utilize of variety of information distribution techniques. The results could also imply that if proper understanding strategies are in place there is an opportunity for changing the attitudes of community members towards SWM.

Table 4.12: How Respondents Became Aware of Solid Waste Management

Means of awareness through	Frequency	Percentage
Ward development committee campaigns	69	70.4
Fellow community members	20	20.4
Own initiatives	9	9.2
Total	**98**	**100**

Source: Field Research (2015)

4.5.2 Attitude of Community Participation Towards Solid Waste Management

According to Thompson (1985) stated that negative attitude towards SWM can be attributed to the colonial past when the government was expected to do everything yet, communities have a significant role in terms of participating in development activities. Table 4.14 shows that, (55%) of respondents had unfavorable attitudes towards solid waste management, (25%) had favorable attitudes towards solid waste management and (20%) had neutral attitude. This implies that the overall attitude towards solid waste management was unfavorable; therefore most residents had negative response towards solid waste management. The results are reliable on those

in Table 4.12 which indicated that community members do not adequately participate in SWM due to the perception that it is basically a responsibility of local government authorities.

Table 4.13: Three Scales of Overall Attitude of Community Participation Towards SWM

Attitude scale	**Frequency**	**Percentage**
Not favorable attitude	55	55
Indifferent attitude	20	20
Favorable	25	25
Total	**100**	**100**

Source: Field Research (2015)

4.5.3 Opinions on Types of Contributions as a Means of Community Participation in Solid Waste Management

Voluntary or other forms of contributions are indeed fundamental to development activities success (Nyangira, 1970 and Oakley, 1991). Responses were sought from the respondents about the mode of contribution to SWM.

Table 4.14: Types of Contributions and Participation in Solid Waste Management

Opinions on types of contributions	Frequency	Percentage
No contribution in SWM	78	79
Cash payment on collection at household level	15	15.2
Labour contribution during collection and disposal	5	5.1
Material collection/ provision of wheel barrows	1	1.1
Forms of contributions are necessary	0	0
Total	**99**	**100.4**

Source: Field Research (2015)

Results in Table 4.14 indicate that the majority (79%) of the respondents were not of the opinion that there is no need for any type of contribution/involvement in SWM agreeing with earlier observation that SWM is perceived as a task of local government authorities.

Results in Table 4.15 indicated that a significant proportion (about 88%) of the households interviewed only participate at the level of collection and storage of the generated solid waste. Insignificant proportion participates at other levels such as separation, transportation and recycling. The results are consistent with early observations (Table 4.7 and 4.10) which indicated that SWM at household level is a severe problem due to inferior storage facilities which are mostly plastic bags posing serious health problems. Especially few households are expected to contribute further than collection and storage level due to insufficient transportation and associated facilities.

Table 4.15: Level of Participation in Solid Waste Management by Households

Level of participation by community at household level	Frequency	Percentage
Participation in collection and storage of SW	88	88
Participation in transportation and disposal	10	10
Participation in separation and re-use	2	2
Total	**100**	**100**

Source: Field Research (2015)

4.5.4 Level of Community Awareness about Using Composting as an Alternative Solid Waste Management and Potential Income Generation

4.5.4.1 Level of Community Awareness on Composting and Potential Benefit

As indicated earlier composting could be one of the potential and sustainable solid waste management strategies, in addition to income generation. Composting could be

a very practicable recovery alternative over solid waste management (Mbuligwe and Kasenga, 2002).

Since most local authorities have become economically constrained in providing efficient management of solid waste, a possibility of converting a significant proportion of municipal solid wastes to organic earth like material by means of composting can provide a significant contribution to the solution of the problem (Linzner, 2007). Respondents were asked about their level of awareness on composting. The results in Table 4.16 indicated that significant ratios of respondents are fully not aware that composting could be used as means of waste management and income generation. This was expected since this alternative is rarely practiced in most of urban areas in Tanzania. If well planned and executed composting could be a sustainable alternative of solid waste management in most of our urban and peri – urban areas since about 70 - 80% of the generated solid waste is bio-degradable hence a possibility of composting. This will provide fertilizer to about 43.3% of Municipality residents who depend on urban agriculture for their livelihood (KMC, 2012/13). Also composting could play a role of source of organic fertilizer and income to urban dwellers.

Table 4.16: Level of Awareness about Composting and Potential Benefits

Level of awareness on composting	Frequency	Percentage
fully not aware	73	73
Moderately aware	16	16
Aware	11	11
Total	**100**	**100**

Source: Field Research (2015)

4.5.4.2 Possibility of Forming Groups for Composting Purposes

Groups are a key factor for effective participation and successful implementation of community activities, groups are used to urge authorities to integrate agriculture in urban planning (Lober, 2011). The purpose of such groups is to offer the municipalities an alternative waste management tool and creation of micro enterprises based on compost making. Such groups seek to create sustainable recycling of solid wastes to produce affordable organic fertilizer. The idea is to mobilize communities to collect and make compost out of the generated solid wastes. Results in Table 4.17 indicated that 69% of respondents were of the opinion that there is a possibility of forming groups for composting, the rest (31%) did not agree on the possibility of forming groups for composting. Focused group discussions indicated that there is a high possibility of forming groups for purposes of composting provided members of the community well understand. Such groups could be site specific. For example, in market places vegetable vendors could form groups that are targeted in composting crop/vegetable remains hence reducing biodegradable solid waste. These results are dependable on the study findings conducted in Brazil and Argentina which indicated that, CBOs and site specific groups have emerged with a component of refuse collection, separation and composting which apart from addressing the problem of SWM have also generated income to most of the city dwellers (Fiensten, 1975).

Table 4.17: Possibility of Forming Groups for Composting

Possibility of forming groups	**Frequency**	**Percentage**
Yes	69	69
No	31	31
Total	**100**	**100**

Source: Field Research (2015)

4.6 Suggestions for Improvement of Community Participation in Solid Waste Management

Focused group discussions were conducted in which respondents were asked to give proposals for improvement of community participation in solid waste management. Results in Table 4.18 indicated that the provision of community education and awareness creation ranked highest followed by provision of collection containers and allocation of adequate funds to municipal for purposes of building their capacity in SWM. Enforcement of existing by-laws ranked forth. These results suggest that if communities are made aware and educated on issues such as their role in SWM and formation of site specific groups which could address issues like compost making, participation in SWM will be enhanced.

Focused group discussions indicated that compost making could be an entry point for increased participation. Previous studies by Akinmoladun and Adejumo (2011) indicated that about 70 - 80% of the generated solid waste in urban areas is of organic nature which can be turned into organic fertilizer and source of income if well planned and organized.

Table 4.18: Suggestion or Proposal for Improving Community Participation in SWM

Proposal for improving Community Participation in SWM	Respondents	
	Yes	No
Make normal supervision	2	8
Provide community education and awareness	8	2
Law enforcement to non payers	9	1
Allocate enough container/ collection points in streets	10	0
Allocate sufficient collection funds for SWM services	9	1

Source: Field Research (2015)

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS AND AREAS FOR FURTHER STUDY

5.1 Conclusion

The objective of this study was to assess the degree of community participation in solid waste management. Results indicated that vegetable and food remains covers about 60-70% of the generated solid waste. However, the Municipal authorities can only collect and dispose off about 54% of the collected SW. The rest is not properly managed pointing to a possibility of environmental and health problems. Results also indicated that at household and community levels, lack of collection and disposal facilities is a major problem. Solid waste management is largely perceived to be a responsibility of local government authorities. Most members are not aware of their role in SWM and their attitude towards participating in SWM is quite unfavorable. Results further suggest that since the traditional SWM practices cannot be sustained; there is a need to look for other alternatives such as composting.

There is a possibility of forming site formal groups which could address the issue of composting. This could be an attractive alternative since apart from providing fertilizer source it could also generate income for the majority of the Municipality dwellers. In any case, there is a need to educate and sensitize the community if meaningful and sustainable SWM is to be achieved.

5.2 Recommendations

Based on the study findings the following recommendations are relevant:

(i) Efforts should be directed towards educating and emphasizing community members about their role in SWM activities. This will enhance their participation in SWM matters.

(ii) Emphasis should be targeted to promote sustainable alternative approaches of managing solid waste such as composting and recycling through use of site formal groups. This will also contribute to enhanced urban agriculture as well as income generation.

(iii) A strong link/cooperation between the community and local government authorities should be encouraged for purposes of enhancing community participation in SWM.

(iv) Active and empowered Ward environmental committees should be created for purposes of enhancing participation at lower levels.

(v) Community waste management fund should be established for purposes of meeting some of the SWM costs such as the provision of basic facilities for collection and storage.

5.3 Area for Further Study

This study has raised several urban environmental issues and questions which were either outside the scope of this study or require continued research in the future. The study intended to assess the degree of community participation in solid waste management. This study stand for Kigoma Municipality case, roles of different partners who could be useful in horizontal and vertical linkages was not defined. This act almost cut-off such potential stakeholders from contributing a stake to community participation in solid waste management. This is a weakness in a

government aspiring to achieve communal action in Municipal solid waste management, as follows:

Future research can focus on how such stakeholders can be involved and utilized fully to promote community based organizations in Municipal solid waste management through various modes of partnerships in peri-Urban areas.

Studies can also be carryout on assessing the factors affecting implementation of disposal technology in Kigoma Municipality councils.

It is very important to assess the impact of solid waste management to budget every financial year

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APPENDICES

Appendix I: Questionnaires for Environmental Officer

The purpose of this questionnaire is to collect information from Environmental Officer that will help in the research entitled: to assess the degree of Community Participation in Municipal Solid Waste Management. Case of Kigoma Municipal Council.

Section A: Respondent personal characteristics

This questionnaire will be treated confidential and for the purpose of this study only. Please, put a tick in box provided that best fit your response and use the space provided for the questions that need explanation.

Date .....

1. Ward..... and Occupation.....

2. Sex: male ( ) Female ( )

3. Age of respondent.....

4. Marital status: single ( ) Married ( ) Divorced ( ) Widowed ( ) Separated ( )

5. Education: No, education ( ) Primary ( ) Secondary ( ) Certificate/Diploma ( )

SECTION B: Research questions 1: To categorize the source and types of SW

1. Who has provided the collection facility? (Pick one) Community itself 2).Municipal Council 3) .Nongovernment organization

2. Has Municipal Council provided the right methods of collecting SW from the sources?

   1) Landfill, 2) burning 3) buried waste 4) all

8. Are there any by-law, rules and regulation which govern initiative collection of SW in Public-Community Participation? (Tick one) 1) Yes 2) No
9. Who is the regulatory authorities of the by- Laws of collection of SW?

   1) Municipal Council 2) Community 3) Ward 4) Households'

10. What type of contribution did Municipal Council make during the management of solid waste? (Tick one)

    1) Cash 2) Labor 3) Materials 4) Both of them

11. What are the advantages of composting technology?

    1) Completely unaware 2) Moderately aware 3) Public health and aware

12. Are there any possibilities of forming groups for composting powering solid waste management activities? 1) Yes 2) No
13. How groups can be performed? 1) Municipal Council 2) Ward
14. Are there any measures for mistakes in the Wards? 1) Yes 2) No
15. If yes, what are the measures for mistakes?

    1) Penalty 2) fire to court 3) Both of them

16. Do you separate solid waste into organic and inorganic components before disposal? 1) Yes 2) No
17. Who has primary responsibility for collecting sold waste once it has brought to the transfer point? 1) Municipal Council 2) Private company 3) Waste pickers

Appendix II: Questionnaire for Local Leaders

The purpose of this Questionnaire is to collect information from Local Leader that will help in the research question: Case of Kigoma Municipal Council.

Section B: Factors have an effect on Community participation in Solid Waste Management

1. Are those stakeholders participating full particularly in recruitment of Community to participate in solid waste management? 1) Yes 2) No
2. Are there any by- law, rules and regulations which govern Community participation in solid waste management? 1) Yes 2) No
3. Do you know that Community is among of the key stakeholders in enhancing the achievement in solid waste management in your Community?
   1) Yes, I know 2) No, I don't know 3) I think
3. Are there any groups for strengthening solid waste management activities?
   1) Yes 2) No
4. Is there any Environmental committee in your Ward? 1) Yes 2) No
5. How do you rank the performance of Ward Environmental Committee?
   1) Satisfactory 2) Unsatisfactory 3) Unsure
6. As stakeholders, were you involved in the election of ward Environment Committee members? 1) Yes 2) No

Appendix III: Questionnaire for Households/Respondents

The purpose of this Questionnaire is to collect information from Households that will help in the research question: Case of assessing the level of awareness and attitude towards Community participation in solid waste management in Kigoma Municipal Council

1. Is the waste community based operator (CBO) worked free in the community?
   (1) Yes (2) No
2. Does the waste community based operator (CBO) follow the solid waste schedule during the waste collection in the society? (1) Yes (2) No
3. Do you agree that Municipal authorities participated free to transfer the trash from the dump station to final disposal site? (1) Yes (2) No
4. Do the community leaders educate the households day to day on how to minimize the solid waste in the society? (1) Yes (2) No

Section C: Information on existing situation concerning solid waste management (Generation, collection, storage, transportation, separation and final disposal)

5. What is the main type of generated solid waste in your household?
   1. Vegetable and food remains 2. Leaves/grass
   3. Plastics/bottles/cans 4. Both
6. Is the solid waste collected from your house? 1. Yes 2. No
7. Does your household have a storage facility for storing household solid waste?
   1. Yes 2. No

8. What type of storage facility does your household (or establishment) have for waste storage on your household? 1) Metal or plastic container 2) Immovable container 3). Basket or carton container 4). Plastic bags 5). No container
9. How do you dispose wastes after collection/storage?

   1) Incineration 2) Communal centers/ collection points
10. Who from the members of your household usually discharge garbage at the collection point? 1) Male head of household 2) Female head of household 3) Any adult 4).Any child between the age of 12 and 18 5). Don't know
11. Do you have a communal collection centre/ point in your area?

    1). Yes 2). No
12. What is the distance from your home to your collection point?

    1). Less than 100 meters 2). 100 to 300 meters 3). 300 to 500 meters

    4). More than 500 meters 5). Do not know
13. Who has provided the collection facility?

    1) Community itself 2).City council 3) Others
14. How do you transport solid waste from the household to the communal collection centre? a) By wheelbarrow. b) On head c) By bicycle d) others (specify)
15. What is your opinion about the communal containers in your neighborhood?

    1. They are too far away from the house 2. They are too small to contain all solid waste 3. They produce unpleasant odours 4. Nothing is wrong with the communal containers 5. No opinion
16. Do you separate solid waste into organic and inorganic components before disposal? 1. Yes, do separate 2. No, do not separate

17. If yes in Qn. 20, what is the use of the separated solid waste components?

a) Not applicable (do not re-use/recycle) b) Soil conditioner (composting) c) Source of energy d) Direct re-use

Section D: Community awareness on solid waste management

18. What do you understand by solid waste management?

1). Collection of solid waste by Local authority

2). Incineration

3). Dumping wastes in landfill

4). Collection of garbage in open places

5). Proper collection, recycling and disposal of solid waste

19. How did you happen to know about solid waste management (Tick one)

1). through ward development committee awareness campaigns

2). through fellow community members

3). through my own initiatives

4). Workshops, seminars, training and guidelines

5). Others (Specify)…….

20. Do you know the concept of community participation in solid waste management? (1). Yes, I know it…… (2). No, I do not know……

21. If yes, what is all about? .....

22. Does the Municipal Council provide training, guidelines or awareness on community participation in solid waste management? (Tick one).

1). Yes…….. 2). No……

23. Have you ever attended any seminar, training/workshop, awareness creation on issues related to solid waste management?

    1). Yes…… 2). No……..

24. If yes in Qn. 47, how often did you attend the training? .....

Section E: Levels of Participation

25. Have you ever participated in any means/level in solid waste management in your ward? 1). Yes 2). No

26. If yes in on, 49 what were the means/ levels of participation?

    1). Participation in collection and storage of SW

    2). Participation in transportation and final disposal

    3). Participation in separation and re-use/recycling

27. Are you satisfied with the type of participation by the community in solid waste management in your ward? 1). Yes 2). No

Section F: Community awareness on composting and its benefits**.**

28. Do you know the concept of composing? 1). Yes 2). No

29. If yes in Qn. 52 to what extent are you aware about composting?

Section G: Challenges associated to solid waste management

Research question for stakeholders or households

30. What is the distance from your home to your collection point?

    1). Less than 100 meters 2). 100 to 150 meters 3). 150 to 300 meters 4). More than 300 meters 5). Perhaps

31. Who has provided the collection facility?

    1) Community itself 2) Municipal council 3).Non

32. How do you transport solid waste from the household to the communal collection centre? a) By wheelbarrow. b) On head c) By bicycle d) others (specify)

33. Do you have a communal collection centre/ point in your area?

    1). Yes 2). No

34. Who has primary responsibility for collecting solid waste once it is brought to the transfer point? 1) Municipal Council 2) Private company 3) Neighborhood group 4). don't know

35. What is your opinion about the communal containers in your neighborhood?

    1. They are too far away from the house 2. They are too small to contain all solid waste 3. They produce unpleasant odours 4. Nothing is wrong with the communal containers 5. No opinion

36. To what extent these solid wastes contributed to harmful the community health after dumped in improper area? 1) Malaria 2) Diarrhea 3) both

37. What are the common Insects being influenced by improper dumped solid waste in the community? 1). Flies, 2).scavenging animal 3), mosquitoes 4), all

Appendix IV: The Checklist for Focus Group Discussion

1. Are you aware about the concept of solid waste management?
2. Which solid waste management practices commonly used in the ward? Rank them.
3. Which are the reasons for unproductive solid waste management services in the Municipality? Rank them
4. What do you feel are main problems/limitations in managing solid waste at Household and community level? Rank them
5. Do you know the concept of composing?
6. What are the benefits of composting technology?
7. Do you have any suggestions to improve the situation of community participation in solid waste management?